

CLAIMS

1. Apparatus for imaging an area of a surface along a viewing angle that is oblique to the surface, the optics comprising:

an afocal optical relay, which is adapted to form a tilted initial image of the area by collecting optical radiation from the area along an optical axis oriented at the viewing angle;

a tilt correction unit, which is coupled to correct a tilt of the initial image so as to form a substantially undistorted intermediate image; and

a magnification module, which is coupled to focus the intermediate image onto an image detector.

2. The apparatus according to claim 1, wherein the afocal optical relay is telecentric and has unit magnification.

3. The apparatus according to claim 2, wherein the afocal relay has a central pupil and comprises:

a plurality of lenses, which are symmetrically arranged around the central pupil; and

a spatial filter positioned at the central pupil.

4. The apparatus according to claim 3, wherein the initial image formed by the afocal optical relay is tilted by a tilt angle that is substantially equal to the viewing angle.

5. The apparatus according to claim 4, wherein the tilt correction unit comprises a prism having an entrance face oriented substantially at the tilt angle of the initial image, and an exit face substantially parallel to a plane of the intermediate image.

6. The apparatus according to claim 5, wherein the intermediate image comprises an imaginary image.
7. The apparatus according to claim 1, wherein the magnification module comprises multiple, selectable magnifying elements with different, respective magnifications, wherein all the magnifying elements have an object plane at the intermediate image and an image plane at the image detector.
8. A method for imaging an area of a surface along a viewing angle that is oblique to the surface, the method comprising:
 - forming a tilted initial image of the area by collecting optical radiation using an afocal optical relay along an optical axis oriented at the viewing angle;
 - correcting a tilt of the initial image so as to form a substantially undistorted intermediate image; and
 - focusing the intermediate image onto an image detector.
9. The method according to claim 8, wherein the afocal optical relay is telecentric and has uniform magnification.
10. The method according to claim 9, wherein forming the tilted initial image comprises spatially filtering the collected optical radiation using a spatial filter positioned at a central pupil of the afocal optical relay.
11. The method according to claim 10, wherein forming the tilted initial image comprises forming the initial image at a tilt angle that is substantially equal to the viewing angle.
12. The method according to claim 11, wherein correcting the tilt comprises intercepting the collected optical radiation following the afocal optical relay using a prism

having an entrance face oriented substantially at the tilt angle of the initial image, and an exit face substantially parallel to a plane of the intermediate image.

13. The method according to claim 12, wherein the intermediate image comprises an imaginary image.

14. The method according to claim 8, wherein focusing the intermediate image comprises setting a magnification of the image detector by selecting one of multiple, selectable magnifying elements with different, respective magnifications, wherein all the magnifying elements have an object plane at the intermediate image and an image plane at the image detector.